

no case more than 1 inch below the lowest permissible water level.

(i) The lowest permissible water level shall be determined as follows:

(1) Vertical firetube boilers, one-half of the length of the tubes above the lower tube sheets.

(2) Vertical submerged tube boilers 1 inch above the upper tube sheet.

(3) Internally fired firetube boilers with combustion chambers integral with the boiler, 2 inches above the highest part of the combustion chamber.

(4) Horizontal-return tubular and dry back Scotch boilers, 2 inches above the top row of tubes.

(j) [Reserved]

(k)(1) Fusible plugs shall be cleaned and will be examined by the marine inspector at each inspection for certification, periodic inspection, and oftener if necessary. If in the marine inspector's opinion the condition of any plug is satisfactory, it may be continued in use.

(2) When fusible plugs are renewed at other than the inspection for certification and no marine inspector is in attendance, the Chief Engineer shall submit a written report to the Officer in Charge, Marine Inspection, who issued the certificate of inspection informing him of the renewal. This letter report shall contain the following information:

(i) Name and official number of vessel.

(ii) Date of renewal of fusible plugs.

(iii) Number and location of fusible plugs renewed in each boiler.

(iv) Manufacturer and heat number of each plug.

(v) Reason for renewal.

[CGFR 68-82, 33 FR 18815, Dec. 18, 1968, as amended by CGD 81-79, 50 FR 9432, Mar. 8, 1985; USCG-1999-4976, 65 FR 6500, Feb. 9, 2000]

**§ 52.01-55 Increase in maximum allowable working pressure.**

(a) When the maximum allowable working pressure of a boiler has been established, an increase in the pressure settings of its safety valves shall not be granted unless the boiler design meets the requirements of this subchapter in effect at the time the boiler was contracted for or built; but in no case will a pressure increase be author-

ized for boilers constructed prior to the effective date of the regulations dated November 19, 1952, if the minimum thickness found by measurement shows that the boiler will have a factor of safety of less than 4½. The piping system, machinery, and appurtenances shall meet the present requirements of this subchapter for the maximum allowable working pressure requested. An increase in pressure shall be granted only by the Commandant upon presentation of data or plans proving that the requested increase in pressure is justified.

(b) When an existing boiler is replaced by a new boiler designed to operate at pressures in excess of the pressure indicated on the certificate of inspection for the previous boiler, an analysis of the complete system shall be made, including machinery and piping, to insure its compatibility with the increased steam pressure. The maximum allowable working pressure on the certificate of inspection shall be based on the results of this analysis.

**§ 52.01-90 Materials (modifies PG-5 through PG-13).**

(a) Materials subject to stress due to pressure shall conform to specifications as indicated in paragraph PG-5 through PG-13 of the ASME Code except as noted otherwise in this section.

(b) Material not fully identified with an ASME Code approved specification may be accepted as meeting Coast Guard requirements provided it satisfies the conditions indicated in paragraph PG-10 of the ASME Code.

(c) (Modifies PG-5.5) When the maximum allowable working pressure (See PG-21) exceeds 15 pounds per square inch, cross pipes connecting the steam and water drums of water tube boilers, headers, cross boxes and all pressure parts of the boiler proper shall be made of a wrought or cast steel listed in Table PG-23.1 of the ASME Code.

(d) (Modifies PG-8.2.2.) The use of cast iron for mountings, fittings, valves, or cocks attached directly to boilers operating at pressures exceeding 15 pounds per square inch is prohibited.

(e) (Modifies PG-11.1.1.) The material, design, construction and workmanship of pumps shall be at least

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equivalent to the standards established by the American Bureau of Shipping or other recognized classification society. See part 58 of this subchapter.

[CGFR 68-82, 33 FR 18815, Dec. 18, 1968, as amended by CGD 73-254, 40 FR 40163, Sept. 2, 1975; CGD 81-79, 50 FR 9432, Mar. 8, 1985]

### § 52.01-95 Design (modifies PG-16 through PG-31 and PG-100).

(a) *Requirements.* Boilers required to be designed to this part shall meet the requirements of PG-16 through PG-31 of the ASME Code except as noted otherwise in this section.

(b) *Superheater.* (1) The design pressure of a superheater integral with the boiler shall not be less than the lowest setting of the drum safety valve.

(2) Controls shall be provided to insure that the maximum temperature at the superheater outlets does not exceed the allowable temperature limit of the material used in the superheater outlet, in the steam piping, and in the associated machinery under all operating conditions including boiler overload. Controls need not be provided if the operating superheater characteristic is demonstrated to be such that the temperature limits of the material will not be exceeded. Visible and audible alarms indicating excessive superheat shall be provided in any installation in which the superheater outlet temperature exceeds 454 °C (850 °F). The setting of the excessive superheat alarms must not exceed the maximum allowable temperature of the superheater outlet, which may be limited by the boiler design, the main steam piping design, or the temperature limits of other equipment subjected to the temperature of the steam.

(3) Arrangement shall be made for venting and draining the superheater in order to permit steam circulation through the superheater when starting the boiler.

(c) *Economizer.* The design pressure of an economizer integral with the boiler and connected to the boiler drum without intervening stop valves shall be at least equal to 110 percent of the highest setting of the safety valves on the drum.

(d) *Brazed boiler steam air heaters.* Boiler steam air heaters utilizing brazed construction are permitted at

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temperature not exceeding 525 °F. Refer to § 56.30-30(b)(1) of this subchapter for applicable requirements.

(e) *Stresses.* (Modifies PG-22). The stresses due to hydrostatic head shall be taken into account in determining the minimum thickness of the shell or head of any boiler pressure part unless noted otherwise. Additional stresses, imposed by effects other than internal pressure or static head, which increase the average stress over substantial sections of the shell or head by more than 10 percent of the allowable stress shall be taken into account. These effects include the weight of the vessel and its contents, method of support, impact loads, superimposed loads, localized stresses due to the reactions of supports, stresses due to temperature gradients and dynamic effects.

(f) *Cylindrical components under internal pressure.* (Modifies PG-27.) The minimum required thickness and maximum allowable working pressure of boiler piping, tubes, drums and headers shall be as required by the formula in PG-27 of the ASME Code except that threaded boiler tubes are not permitted.

[CGFR 68-82, 33 FR 18815, Dec. 18, 1968, as amended by CGD 81-79, 50 FR 9432, Mar. 8, 1985]

### § 52.01-100 Openings and compensation (modifies PG-32 through PG-39, PG-42 through PG-55).

(a) The rules for openings and compensation shall be as indicated in PG-32 through PG-55 of the ASME Code except as noted otherwise in this section.

(b) (Modifies PG-39.) Pipe and nozzle necks shall be attached to vessel walls as indicated in PG-39 except that threaded connections shall not be used under any of the following conditions:

(1) Pressures greater than 4137 kPa (600 psig);

(2) Nominal diameters greater than 51mm (2 in.); or

(3) Nominal diameters greater than 19mm (0.75 in.) and pressures above 1034 kPa (150 psig).

(c) (Modifies PG-42). Butt welding flanges and fittings must be used when full radiography is required by § 56.95-10.

[CGD 81-79, 50 FR 9432, Mar. 8, 1985]